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ABSTRACT

This paper addresses five aspects of educational planning, summarizing recent trends in theories, models, and strategies that apply to planning at the national level. Individual chapters focus in turn on 1) issues and problem areas addressed by planning, 2) planning models in use, 3) nonformal education as a focus of planning, 4) indicators of educational outcomes, and 5) planning processes yielding strategies and social action. The author considers these topics sequentially, reviewing the research literature relevant to each without a great deal of elaboration or critical commentary. Recurrent themes and major unresolved issues are briefly summarized, however, in the final chapter. An extensive bibliography is contained in the appendix. (Author/JG)

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EDUCATIONAL PLANNING:

NOTES ON THE STATE OF THE ART

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March 1977

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EDUCATIONAL PLANNING: NOTES ON THE STATE OF THE ART

Introduction

This paper addresses five aspects of educational planning, summarizing recent trends in theories, models and strategies that apply to planning at the national level:

1. Issues and problem areas addressed by planning
2. Planning models in use
3. Non-formal education as a focus of planning
4. Indicators of educational outcomes
5. Planning processes yielding strategies and social action

Although these questions are considered sequentially, they are closely interrelated. Given the broad scope of this review, literature will be cited without much elaboration or critical commentary on gaps and weaknesses. Recurrent themes and major unresolved issues are summarized, however, in the concluding section of the paper.

Educational planning is no longer as well defined a field as it used to be. "Ten years ago," said a senior staff member at IIEP, "we felt confident in drawing up a list of issues and research priorities for educational planning. Now everything is fuzzier." The assumptions of the old models are increasingly coming under fire. The shift from clear-cut economic criteria to broader social goals in national development makes it more difficult to plan with clearly defined objectives in view. Techniques proliferate, some based on unorthodox concepts of social science. Experience shows the need for better integration of formal planning methods with political processes

bearing on implementation of plans, dragging methodologists into questions of ideology. There is new talk of "learning societies," which move educational processes and planning functions out of specialized institutions into society at large - factories, mass media, action campaigns, storefront community groups. In this sense, perhaps the single greatest shift in educational planning in the seventies is the sense that, for better or worse, the boundaries between educational planning and other social processes are breaking down.

Consequently, making sense of educational planning requires some back tracking to the fundamentals. "Planning" can be defined as foresight to generate social action toward articulated objectives. "Foresight," "action," and "objectives" can be treated with varying mixes of unquestioned assumptions, focused calculation, informed judgment, systematic doubt, or programmatic research, depending on the planner's biases, methodological toolkit, available data, sponsorship, and local circumstances for putting plans into effect.

When applied to teaching/learning activity that is organized into programs, institutions, and education and training systems, comprehensive and systematic educational planning covers the development and statement of goals; determination of policy and program alternatives; assessment of costs and resources and evaluation of outcomes of effects; and the monitoring of allocations decisions and implementation activity. Results of this last step are fed back into what is a continuous process. This is the rationalistic view of educational planning. (Hudson, Davis et al, 1976, p. 7.) There are other planning traditions, including transactive planning, advocacy planning, radical planning, and disjointed incrementalism. These rely more on building up and outward from small-scale experiments. Whereas rational planning builds on <u>codified</u> knowledge, and comprehensive, sequential analysis with

goals, program alternatives, evaluation and implemention, in contrast, the other, less conventional versions of planning emphasize intuitions, skills, and continual adjustment within specific social contexts. The present state-of-the-art review mainly deals with the more conventional "rationalistic" tradition of educational planning. It will become apparent, however, that there do exist alternative planning styles — that is, alternative techniques, cognitive models, epistemic bases, communication structures, ideological premises, and alternative assumptions about the nature of society. Moreover, some of these alternative styles of planning have major contributions to make in response to particular issues emerging on the educational planning scene, both in enriching the repertoire of available methods and in articulating substantive questions about the role of education in society.

The present review does not offer a clear distinction between educational planning as carried out in the U.S. versus planning in other countries, especially as major work in U.S. institutions relates to developing nations. Among the roughly 800 institutions listed by the U.S. Office of Education in its 1976 Education Directory, only a half dozen are categorized under the rubric of "educational planning." A notable inclusion is the International Institute for Educational Planning in Paris, whose Unesco affiliation and world-wide connections in training, research, consulting and clearinghouse functions make it probably the most representative institution of educational planning from which to judge the state of the art. IIEP itself publishes occasional bibliographies, inventories of research needs, and institutional directories. Its 1964 directory listed 18 educational planning institutions for the U.S., including [illegible]niversity-based programs, the East-West Center, Brookings, and the Ford/Carnegie-sponsored Inter-University Study of Labor Problems in

Economic Development.

Representative journals in the field would include Educational Planning (edited at the Ontario Institute for Studies in Education), Socio-Economic Planning Sciences (published in Britain), The Journal of Human Resources, and Comparative Education Review. This review draws generally on these sources as well as the references cited in the bibliography and bibliographical supplement (Appendix A).

I. EMERGING ISSUES IN EDUCATIONAL PLANNING

Traditionally, educational planning has comprised three basic approaches: (1) estimation of social demand; (2) manpower planning; (3) cost-effectiveness analysis (Blaug, 1967; Roger and Rucklin, 1971, p.224). This can be extended to a broader list of about 20 themes, based on a review of recent publications addressed to the question of new issues in educational planning, (IIEP, 1970; IIEP, 1976; OECD, 1973; IDRC, 1976; Unesco, 1970; Faure, 1972; Platt, 1970). Many of these themes (eleven) are mentioned by only one or two sources,* but nine issues were cited with greater frequency: the three "classic" issues already mentioned: (1) social demand; (2) manpower forecasts; (3) cost-effectiveness, plus the following: (4) integrated planning; (5) planning at local levels; (6) lifelong education; (7) equity; (8) work-relatedness of education (problems of the well-educated unemployed); and (9) the broader context of development objectives and ideology.

Each of these issues will be briefly reviewed below. Some have methodological implications which are considered later (Section II). Almost all these issues have implications for the design of educational performance indicators (Section IV). In addition, most bear directly or indirectly on the rationale for non-formal education, reflecting some of the appeal of educational planning aimed at processes outside the formal school system (see Section III). The overall relationships between issues (this section), methodologies, and theories of social development are sketched out in the concluding sections of this paper.

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*These include issues of new educational media; innovation more generally; case study analysis; problems of rural and poor areas; public participation in planning; higher education; long-range futures; management and administration (problems of plan implementation); cost and finance; evaluation; and non-formal education.

1. Social demand. Forecasts of social demand for education are usually based on demographic analysis, involving survival rates for age-group cohorts. Other factors beside the population profile have an affect on the effective demand for schooling: income levels and distribution; private costs of education; non-formal schooling opportunities; job markets and requirements; shifts in cultural norms; military draft (or avoidance of draft); political pronouncements affecting social expectations; and the local accessibility of educational opportunities. In practice, however, most of these refinements are ignored. University application levels, for example, are especially sensitive to non-demographic factors, but adjustment tend to be reactive rather than anticipative based on advanced planning. Major demand shifts have occurred at lower school levels chiefly in times of significant political change. Indeed, widespread demographic-based planning became prominent at the time of Unesco's involvement in educational planning for newly independent nations during the sixties. Among industrialized nations, long range forecasts are important especially when the population profiles show discontinuous strictures or bulges (Morrison, 1976). Small variations in student numbers at a particular level of education can increase by whole orders of magnitude the demand for flow of new teachers to that level, which partly explains the tendency for periodic gluts and scarcity in the market for teachers in the United States.

In sum, demographic analysis continues to have an important role as a nation moves from lower to higher stages of development. Fluctuations get smaller, but data improvements allow greater precision in forecasts. More research is needed, however, on the sensitivity of demand for education in response to factors other than demographic pressures.

2. Manpower planning generally involves the projection of gross economic targets, which are then broken down into sectoral needs and translated into job

requirements through industrial-occupational matrices. Educational plans can then be based on the estimated gap between future occupational needs and projected manpower supplies, adjusted for migration, death and retirement.

Some versions of this approach use highly aggregate categories. Tinbergen and Bos (1965), for example, calculate only the relative proportions of graduates needed at primary, secondary, and post-secondary levels of education as a function of gross levels of economic development. Other studies focus on detailed analysis of particular sectors and highly disaggregated occupational categories. The U.S. Department of Labor, for example, issues an occasional bulletin, Occupational Manpower and Training Needs, covering 240 occupations, estimated to comprise about two-thirds of the 1985 labor force, and focussing mainly on skills needing the most advanced training. (See U.S. Bureau of Labor Statistics, 1974.) Most manpower planning in the U.S. is done at the state and metropolitan levels, but they receive technical assistance from federal agencies, and the U.S. Congress has stipulated that federally-financed training programs be based upon prior assessment of relevant manpower needs. (Ibid, p.1.)

Several current developments in the manpower planning literature deserve note. One is increasing recognition of manpower planning and benefit-cost analysis as complementary approaches to the same problem, especially when the focus is on specific occupational and training categories. Consequently, they deserve integrated rather than separate analytical formats. (See Somers and Woods' Cost-Benefit Analysis of Manpower Policies, 1969; also Hardin and Borus, 1971.)

Secondly, increasing attention is being given to labor market processes as mediators of manpower policy outcomes. Markets importantly define the geographic units for analysis, the level and flexibility of industry/occupation/

training coefficients, and the "permeability" of economic activities to new trainees. Theories of labor market segmentation, in particular, help explain why training programs for "needed" occupations often fail to help the unemployed find jobs. (See Levitan, Mangum and Marshall, 1976; Doeringer and Piore, 1971; Doeringer et al, 1972.)

Third, there is scattered writing on the adaptation of production processes to accommodate available manpower, rather than vice versa (IIEP, 1970). This is discussed later in Section III (Non-Formal Education) although it goes well beyond the usual concept of non-formal education.

Fourth, and finally, it is recognized that there are many mechanisms that can complement or partially substitute for manpower planning. These include: price mechanisms in the labor market; non-formal training; early warning "glut" and "shortage" indicators (such as ratios of jobs to applicants); use of education as a "holding institution" for people out of work; adjustments of formalistic job requirements; government investment projects geared to absorbing redundant skills (especially as part of counter-cyclical fiscal spending projects); adjustments in work-week; selective enforcement of immigration policies; adjustments in Armed Forces preparedness levels; military training; encouragement of exit or entry into the household sector (especially among teen-agers, women and workers over 60, as marginal members of the labor force); short-term counseling; on-the-job retraining; training for more adaptive work attitudes (as opposed to cognitive and manual skills); facilitation or inhibition of work entry (creation of counter incentives to work being a major issue in welfare reform); energy and technology incentives affecting labor-absorbing industries; worker sabbaticals; control over labor-market "gates" (unions, professional associations, political and social contacts, racial discrimination); home study courses (5 million enrolled in 1972, according to the BLS, 1974, p.21); VISTA-type service

programs; varying rates of absorption into illegal economic activities; general media reports on new economic opportunities or problems of occupational joblessness. The list could go on.

With all these mechanisms at work, one might well ask, Why are manpower plans needed at all? Evidently, manpower forecasts are useful where (a) the gestation period for specific skills is very long (eg doctors); (b) where there is need to coordinate creation of jobs pari passu with new skills (viz the pattern of emigration among highly skilled occupations from poorer to richer nations); and (c) where the data exists for this kind of planning. The need for manpower planning is perhaps greatest is in less developed countries: the gaps between supplies and needs are large; key occupations for "modernization" may require educational changes all the way down to elementary school; and there is likely to be a weaker infrastructure of short-term adjustment mechanisms, such as listed in the preceding paragraph. The problem is, lesser developed countries generally have fewer resources for putting plans into effect, poorer data to work with, and less resources to pay skilled graudates in competition with foreign markets. (Jamaica, for example, regularly exports more post-secondary graduates than it produces.) Does manpower planning pay off, then? The answer must come in part from scrutinizing manpower policies within a complementary framework of educational benefit-cost analysis.

3. Cost-effectiveness analysis. Issues of educational cost-effectiveness can be addressed by various methods, including benefit-cost analysis, rate of returns analysis, estimation of educational production functions, flow models, linear programming techniques, and goals-achievement matrices. Some of the underlying analytical models are discussed later in Section II. Here, the chief concern is with general trends in the application of cost-effectiveness approaches, and the kinds of new questions being raised about educational

"effectiveness" in particular.

It is traditional to look at "costs" in terms of monetary resources, and "effectiveness" in terms of one or more quantifiable measures of progress toward specific objectives (see Figure 1). For actual policy decisions, however, the operational considerations might be exactly the reverse: the most important costs may turn out to be non-monetary costs incurred as side-effects of the intended outcomes; meanwhile, the political push for program implementation may hinge upon monetary benefits to implementors, as distinct from actual services delivered to the ultimate client.

Figure 1

	Type of Factors to be Considered in Computing Cost-Effectiveness		
	Monetary	Other Quantities	Qualitative
Costs	(1)	(3)	(5)
Effectiveness	(2)	(4)	(6)

traditional comparisons

During the sixties, considerable research went into estimating the monetary rate of returns to different types of educational investments. Most studies recognized, however, that many educational benefits cannot be monetized. Consequently, work has tended to shift from cost-benefit to cost-effectiveness studies, involving non-monetary objectives. Some authors emphasize meeting fixed targets at least cost, others the maximization of objectives subject to fixed cost constraints. In either case, cost-effectiveness analysis shifts the emphasis to questions of economic efficiency in undertaking educational missions,

beyond the more fundamental (but often politically redundant) question of whether to undertake a mission in the first place.

The PPBS approach, popular in the late sixties, reflects this "mission"-oriented approach. Despite its numerous critics (such as Hoos, 1972), the basic concept of PPBS is kept alive under various newer guises, such as MBO (Management By Objectives), the Logical Framework approach (used by AID in educational planning), Zero-Based Budgeting, the Goals-Achievement Matrix approach (Hill, 1968, Lichfield, 1970, Hudson 1975), and other formats. These will be discussed further in Section II of this paper.

Social demand analysis, manpower needs estimates, and cost-benefit analysis have made up the core of educational planning since the early sixties. Almost from the beginning, though, other issues have been addressed, largely in an attempt to bridge the varying perspectives of the economists and the educators; the planners and the administrators; the people with long-range models and those with day to day problems to contend with. This raises the next series of issues for discussion.

4. "Integrated" planning refers to coordination of plans and practices among different educational programs and related activities. Often, it refers to coordination between primary, secondary, and higher-level education. Higher education has a tradition of autonomy from state control in most countires, but as college education becomes what high school used to be — a democratic right rather than a path for the chosen few — it has increasingly come under state sponsorship and control (Halstead, 1974). In the United States, state and federal planning for higher education received major impetus under

the Morrill Land-Grant College Act (1863), and again under the Higher Education Facilities Act of 1963. War-time government contracts with universities also set the pattern for close coordination of academic programs with industrial, military, and other governmental programs, to a degree found in few countries outside the U.S. (Kerr, 1954).

The concept of "integrated" planning also refers to overall educational reform, with attention not just to quantitative targets, but curriculum overhaul and new infrastructure — for example, management, program evaluation, and textbook production facilities. In some cases, "integrated" planning refers to the linking of long-term plans and short-term implementation, particularly through budgeting planning. PPBS follows logically from this concern. (On implementation of plans, see Pressman and Wildavsky,1972; Correa, 1975.) Another form of integration refers to the coordination of educational planning with national economic planning, or with regional and local development plans. This leads to the next issue.

5. Localization of planning. The mid-seventies witness a decisive shift of educational planning roles in the U.S. from federal to state and local agencies, particularly in manpower planning. In some cases SMSA's (Standard Metropolitan Statistical Areas) have been delegated planning authority, since these represent logical units for defining labor markets (U.S. BLS, 1974). In previous decades state-level control meant quite the opposite — an attempt to bring central control over otherwise uncoordinated local institutions. (See Halsted, 1974.) More recently, however, with revenue-sharing under the Nixon administration, and the push to decentralize Washington programs under Carter, state and SMSA-level planning will likely receive yet another impetus.

Particularly in the context of planning for developing nations, there is another aspect of localization, which goes beyond the downward delegation of

authority from central to local experts: there is expression of a need for two-way communication, and planning from the "bottom up." This means, in part, learning from local initiatives rather than imposing glamorus innovations from the outside (Unesco, 1970). In addition it reflects a growing appreciation that planners must occasionally touch base with day-to-day realities in the lives of people targeted for improvement. (Hudson et al, 1976; Raper, 1970; Coombs and Ahmed, 1974; Anderson, 1973; Hampden-Turner, 1975; Goulet, 1971.) Edgar Dale once observed that the most important ingredient in education is "to enter sympathetically and imaginatively into the lives of others." (Quoted in Tyler and Williams, 1973, p.31.) The same dictum is now being applied to educational planners as well.

More generally, the increasing emphasis on localization of planning reflects (a) the gradual diffusion of planning skills, (b) political thrusts toward democratic participation in the planning process, and (c) increasing suspicion that planning models based on highly aggregate data are invalid unless the parameters are "tuned" to local conditions. This last point is critical, and will be taken up again in Section II.

6. Lifelong education. There are several confluent lines of thought on lifelong education. One derives from the idea of work-based education (see Davis and Lewis, 1975). Mincer (1962) has estimated that for the male labor force, on-the-job training is as important (in terms of the size of educational investment) as formal schooling, with a comparable social rate of return. Adelson (1971) has examined differential work settings that (apart from capital infrastructure and often without deliberate planning at all) serve to enhance human capital over time, as compared with work settings where human capital "depreciates." Swedish experiments in worker-managed production processes also suggest the importance of treating jobs, education,

worker capabilities and career possibilities as processes in continual evolution, and not as fixed in a once-for-all certificate of competence. (See Grassman, 1972.)

Another premise for the concept of lifelong education derives from the research findings on educational production functions, such as the Coleman Report (1966), showing that inputs associated with formal schoolong could only account for a minor proportion of cognitive achievement levels. The effect of the larger social environment has become more prominent in the literature (see, for example, Jencks et al, 1973), and lifelong education can be interpreted (in part) as an attempt to design that larger environment to enhance learning in ways that formal schooling cannot.

Lifelong education responds also to the realization that people shift jobs in mid-career, often more than once. In affluent societies, moreover, education can be considered a "consumption" good, and not just an "investment in human capital" (as educational planners used to speak of it, from the economic standpoint of allocating scarce resources). More people are returning to college and university programs which they could never afford to complete when younger.

Finally, lifelong education makes sense with the development of non-traditional forms of education — correspondence courses, "open universities" (following Britain's lead), non-formal education (see Section III below), educational television and computer-aided instruction, and increasingly diversified training programs in the military (now more open to women and minorities than in past decades). More favorable social settings for lifelong education can also be glimpsed on the horizon: worker sabbaticals (now being experimented with in Sweden - see Grassman, 1972); wage subsidies for the hard core unemployed (which provides a built-in incententive for firms to raise productivity among workers hired); shorter work weeks and longer vacations; computer-aided

"networks" of part-time teachers and learners seeking ad hoc extension-type courses; and stronger roles for government in creating jobs (viz the Humphrey-Hawkins bill presently before the U.S. Congress).

This leads to a final set of educational issues. They relate less to education as an isolated activity, than to the responsiveness of education to specific problems of social and economic development in the seventies.

7. Equity. The distribution of educational opportunities is a recurrent theme in the planning literature. Often, it appears as simply one item among a list of other educational objectives. (Viz the present review.) Occassionally, reference is made to specific social movements which give "equality" realistic force as a touchstone of social policy. (The 1974 Annual Report of the U.S. Commissioner of Education mentioned equality in reference to then-current developments in promoting the rights of women, and there has been, indeed, a recent surge in the proportion of women seeking jobs. See U.S. Office of Education, 1974, p.7.)

The general shift of the seventies has been away from economic growth as a planning objective toward social objectives - social justice, provision of basic needs, quality of life (Faber and Seers, 1972; Faure, 1972; Dag Hammarskjold Foundation, 1975.) The shift has perhaps been manifested more in rhetoric than action, but one sees promising signs: Tanzania's Declaration of Arusha (1967) was an explicit acknowledgment of the biases of that country's first Five Year Plan toward greater social inequality, and it attempted to deal with this problem by a radical shift in priorities, not least in the field of education. The IIEP has recently identified equality of opportunity as a major research theme to be pursued in the late seventies. (IIEP Bulletin No. 1, September 1976, p.1.) International technical assistance agencies, including OECD, the World Bank, UNDP, Unesco, and AID, are focusing more explicit

attention on the "Fourth World," variously meaning the "25 poorest" nations (characteristically small and landlocked) or the "35 most seriously affected" (those without a share in the growing political strength of the Third World, for lack of oil and mineral resources to bargain with). There is also new recognition of the role of More Developed Countries in hindering more equitable development, through exotic development programs favoring the already-rich (see U.S. General Accounting Office, 1973), technology biases (Dickson, 1975), inappropriate consumption standards (Schumacher, 1973), arms exports, control of media, trade policies, and other indirect policies. Some agencies carrying out research on these issues have also sought ways to inject their findings into policy-making processes. The Economic Commission for Latin America was a forerunner in this tradition; more recent examples are the Intermediate Technology Development Group (London) and the Science Policy Research Unit, based at Sussex University.

One of the most significant contributions to the equity issue came out of the Coleman Report (1966). Contrary to most expectations, the Coleman analysis found that minority (ie, non-white) populations were not facing a major problem of inequal treatment in terms of access to educational resources (at least as measured in this study). Yet minorities were found to be lagging further behind in achievement with every increment in years of schooling attained. In view of these findings the authors of the report took a major step in redefining equality to mean equal educational outcomes, and not simply equal exposure to educational inputs (teachers, books, classrooms, and other learning facilities). The report also identified as a key variable determining educational achievement the student's sense of efficiency, or control over his/her destiny. This signifies a broadening of educational planning to address other factors in the student's environment besides schools that affect achievement,

particularly factors determining the sense of being "an effective person."

These developments are another example of the blurring of lines between educational planning and the larger context of policy-making for social transformation. This is seen in another educational issue which has come to the fore in recent years - the connection between education and work opportunities. The problem addressed here is the gap between schools and jobs that manpower planning has failed to bridge.

8. Work. The U.S. Office of Education Annual Report (1974, pp.5-7) cites a current Gallup survey on why people want education for their children. The first reason given is "to get a better job." Reflecting a similar concern, the Faure Report (1972) proposed a shift in emphasis of educational planning away from aggregate economic objectives toward more specific social objectives with major attention to employment. This concern seems to have arisen from the growing evidence that unemployment can persist even among persons with advanced training geared to national needs. According to Turnham and Jaeger (1971) the average education of the unemployed has been rising in less developed countries. With this problem in view, Edwards and Todaro (1972) have made a strong plea for educational investments complemented by parallel investments in job-creation activities.

There is a growing literature on labor market analysis and manpower policy, reflecting perhaps three distinct schools of thought.* The neoclassical approach holds that employment problems arise from the individual's lack of competitive edge in the labor market. Concepts and analysis derive

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*The subsequent three paragraphs reflect work underway by Kathy Van Ness, a doctoral candidate in Urban Planning at UCLA. Her help is gratefully acknowledged.

the queue theory of labor allocation. There is some recognition of business fluctuations as a source of the problem, but policy emphasis is on training and other forms of "human capital formation."

A second approach focuses on the segmented character of labor markets. (See Cain, 1976.) Piore and Doeringer (1971) refer to dual labor markets; Okun (1975) to a "two tier" model; Bluestone (1970) to a tripartite market (core, peripheral, irregular); Levitan, Mangum and Marshall (1976) to a "multiple" model (professional, mainstream, marginal, and submarginal). All emphasize the demand side of the labor market, and tend to see training as part of a larger policy package, including job development, job restructuring, design of new careers, wage subsidies, anti-discrimination measures and affirmative action, and public service employment.

A third school of analysis builds on the segmented labor market approach, but focuses on the more pervasive social political and economic structures governing labor markets. This radical (or structural) school emphasizes the importance of class differences and capitalist social organization in explaining the failure of marginal workers — even with suitable training — to be absorbed into the economy. Policy recommendations emanating from this school are not clear, short of major social transformation or the generation of ideologically-based social movements committed to finding solutions within well-bounded territorial communities. (The Watts Labor Community Action Committee is a possible example. See Hampden-Turner, 1975.) One theme often expressed by radical analysts, however, is the impossibility of purely local solutions, particularly given the role of multinationals in modern economic systems.*

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*Multinationals, apart from controlling strategic resources, lack the territorial identity to impel a sense of responsibility or political accountability to the communities they affect.

Such issues may appear tangential to educational planning. Nevertheless, questions of ideology and worldview, and their underlying theories of social and economic development, have come to be seen as inescapable issues of planning for the seventies and eighties. It behoves educational planners therefore, to acquire increasing sensitivity to the context in which plans for formulated and implemented. Policy is not cast simply in the mold of technical formulas, but hammered out of contending social priorities, untested theories of social change, and unspoken ideological positions. This leads to the next and final educational planning issue to be considered.

9. Development context. John Simmons (1974) has argued that there are three basic theories to describe the effect of education on individuals and the economy, each with distinct implications for educational planning. (a) The human capital theory has tended to dominate thinking in the planning field: emphasis is on the satisfaction of individual preferences, the cognitive effects of schooling, the effect of education on productivity and wages, and the possibilities of education thereby to reduce social unequality. (b) The progressive theory recognizes the effect of schooling on noncognitive outcomes, and the importance of molding preferences toward shared social objectives. Policy implications extend beyond mere training to educational reforms that equalize opportunities and encourage personal growth and creativity. (c) The structural theory holds that in an industrial society, there are basic contradictions between the production of a work force (the primary function of education) and the fullest development of individual capacities. Schools mirror the social relations of the work place: stress is on cognitive over affective modes of response, discipline over spontaneity, subordination over the taking of initiative, and acceptance of external rewards (grades, economic remuneration) in place of personal satisfaction. The policy

implications of this theory suggest that "basic changes have to be made in the structure of the firm and other economic mechanisms before the dysfunctions of the school system will disappear." (Bowles, 1974, p.9.)*

This is not the place to review these theories in detail or to comment on their merit. It is important to note, however, that educational planning, which a decade ago mainly addressed the problem of human capital formation, now finds itself addressing the political and social context of development more explicitly. (See Hallak, 1975.) For example, in a nation giving major emphasis to self-reliance, like Tanzania, educational planners will have different objectives, data needs, and programmatic options to deal with than planners in other countries. (On the role of education for self-reliant development see Breeden, 1970; the Dag Hammarskjold Foundation, 1976; Hudson et al, 1976, Appendix C; Anderson, 1973.)

There are also major differences in over-all strategies of social/economic development that directly bear on educational planning. The distinction between "top-down" and "bottom-up" planning has received considerable attention since the late sixties, and implications for educators are beginning to be drawn out, particularly for the less traditional "bottom-up" approach. (Hudson et al, 1976.)

In sum, educational planners are having to come to grips with ideological conflicts — excellence vs. equity, local needs vs. national needs, self-reliance vs. interdependence. Resolution of these conflicts begins at the level of politics but it also hinges around the design of educational processes the social commitment of individual teachers, and the social institutions which employ (or discard) graduates of the system. (See Pearl and Reismann,

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*Note the parallel between theories of education and theories of the labor market referred to earlier.

1965; Bowles, Gintis, and Simmons, 1976; Dore, 1975.) Planners can rarely speak of the school anymore as a closed system or separate entity. Educational planning is becoming to be seen more realistically as a process woven into the larger fabric of social forces for change or preservation of the past.

II. EDUCATIONAL PLANNING MODELS

Broadly defined, a "model" consists of an abstracted representation of reality, depicting important relationships. In a planning context, it usually serves to show the relationship between policy objectives, policy variables, the effects of environmental factors mediating programmatic outcomes, and points in the system to be monitored for on-going system maintenance and development.

Models can be divided into two broad classes - algorithms and heuristic aids. (See Fox, 1972.) Algorithms represent processes expressed in mathematical forms constructed in such a way as to yield clear "solutions." Examples are linear programming, benefit-cost and rate-of-return analysis, input-output analysis and other optimization techniques. In this context, Correa (1975) stipulates that a model should consist of (a) endogenous variables, (b) exogenous variables, (c) a plausible set of cause-effect relationships linking the components of the model, and (d) consistency, meaning that the model is neither under- nor over-determined.

Heuristic models, on the other hand, depict logical relations that help in exploration of possible solutions that are nevertheless beyond the capacity of mathematics to specify as "optimal." Examples are gaming and simulation, very long-range forecasting based on explicit judgmental components; sensitivity analysis; goals-achievement and cross-impact matrices; decision trees; block diagrams; and scenario building. In this sense the concept of a "model" may extend to consist of a specific experimental program, whose key elements are clearly spelled out, but which is open to judgmental interpretation and re-analysis on the basis of second thoughts about the dimensions of the problem and type of data brought to bear. Heuristic models may also include "theories for insight" (Davis, 1971, pp.6ff.) The following discussion refers primarily to algorithms rather than verbal or graphic heuristic models.

Davis (1971) lists major classes of educational planning models according to use: (1) target setting (social and demographic; manpower; rate of returns; growth residuals analysis); (2) allocation (mathematical programming, linear and otherwise); (3) input-output (production functions, regression analysis); (4) learning and teaching models; (5) organizational models (decision models, graphics, games, organizational behavior), and (6) comprehensive modelling (simultaneously addressing goal-setting, definition of program alternatives, and evaluation of options). Davis makes the point that the connection between one type of model and the next is very weak. They involve different types of expertise, different degrees of recognition of real world conditions, and different assumptions about the educational process. Especially serious is the discrepancy between theories of learning and models the educational system, for example as expressed in regression analysis (Davis, 1971, 1976; Leucke and McGinn, 1975). There are other, more general problems encountered in planning models, to be reviewed at the end of this paper. Space does not permit commentary on all types of models referred to above, but the state of the art can be suggested by brief review of developments in four areas: (1) manpower planning, (2) educational production functions, (3) cost-effectiveness analysis and (4) heuristic modelling.

1. Manpower planning models. The basic character of manpower models has already been described. Nevertheless, a brief comment on the accuracy of manpower planning is appropriate here, in assessing the state of the art.

The Bureau of Labor Statistics has attempted to assess the accuracy of its own manpower projections, in evaluating the ten year forecasts from 1950 to 1960. Of 108 occupations, only nine were dead wrong; another 24 were substantially off but in the predicted direction (generally in the sense of underestimating rates of growth in expanding sectors); the rest were basically

correct. (U.S. Bureau of Labor Statistics, 1974, p.3.) Strong criticisms have been raised against manpower planning elsewhere, particularly reflecting early-sixties applications under the Mediterranean Regional Project. Mark Blaug writes (1970, p.169), "man-power requirements appraisal is simply an illegitimate extension of Leontief input-output models to periods so long that the assumption of fixed coefficients becomes an absurdity." He points out that a (reasonable) two percent error from year n to n+1 will combine to a 35 percent error in 15 years. As Davis and Lewis note (1975, preface), unemployment rates can be doubled unexpectedly in a single year (as they did in the U.S. from 1973 to 1974), throwing off calculations of incremental needs for selected occupations by wide margins even for short-term planning. The BLS admits that it is very difficult to estimate either manpower supplies or training needs very accurately, given the high variability both in the functional content of job requirements and in the content of training programs. The problem lies both in poor data and real-world variations that cannot be statistically rationalized. (U.S. BLS, op. cit.) Blaug sees the major flaw in manpower forecasting to be in the arbitrary nature of the mix between professional and sub-professional skills assumed necessary for sectoral activities. (Blaug, 1970, p.165.) Other problems, shared by other planning models and methodologies, are discussed later.

2. Educational production functions. The economic basis for allocating education resources requires some calculation of the relationship between inputs and outputs of educational systems. Resources are shifted to inputs which are most efficient (least cost) or effective (adequate for meeting targets), and shifted away from less productive activities. The definition of inputs and outputs will vary (see Table following page). A broad definition of production functions might include whole systems of equations, or possibly

Types of Educational Production Functions

	Inputs	Outputs
School Models	(a) economic resources	(b) educ. activities (eg. pupil-years of instruction, retention rates, curric. reform, team teaching. See Durstine and Hudson, 1972).
Learning Models	(c) educ. activities (see above)	(d) instructional outcomes (usually cognitive ability. See Coleman 1966).
Economic Models	(e) educ. achievements (levels of training)	(f) economic outcomes (aggregate growth, sectoral targets, project goals).

simulation models driven by sets of equations and inequations. These serve the same purpose as a single-equation production function, but disaggregate the transformation processes from inputs to outputs, and may allow more room for judgment, probabilistic relationships between variables, sensitivity analysis, and experimentation with the parameters of the model.

It should also be noted that other types of educational planning models, such as linear programming, incorporate production functions in the form of technological relationships defining the objective function.

There is some overlap between estimation of production functions and "evaluative research" on educational programs. The difference is largely whether one uses sociological tools of analysis (see Heim and Perl, 1974; Leucke and McGinn, 1975; Averch et al 1972; Coleman, 1966), or whether economic methods are used (see Bowles, 1969; Correa, 1975; Fox, 1972; Zymelman, 1973). In the economic approach, relationships are typically depicted by regression

analysis, which specifies relationships in terms of multiple correlation, expressed in a single equation. Correlations are not always accurate as an expression of cause-effect relationships, and there is growing recognition of the disparity between the relationships depicted in regression analysis and those which hold in the real world, based on educational theories and the experience of educational practitioners.

Another serious flaw is the use of aggregate data in calculating production function relationships. Individual schools, individual students, different races, regions of the country, urban-rural populations, groups with different motivations, differences in family and social environment — each of these differences will generate differences in the coefficients of a production function. Say there are eight such "environmental" variables, each of a binomial nature (an extreme oversimplification). There would theoretically be a 2^8 or 256 distinct production functions to calculate. (The Coleman report computed separate equations for white and non-white populations, and for different regions of the country, with marked differences showing up among these equations.)

For this reason among others, there is an understandable reluctance among educational policy-makers to take production functions very literally. Very broad and persistent findings — for example, the importance of non-school factors in determining a large portion of academic achievement — find their way into public consciousness (the theme of "de-schooling society") and into educational policy (for example, renewed emphasis on traditional "3 R's" which constitute the schools' relative advantage; and more attention to non-formal education, with its lower overhead and greater flexibility for experimentation). These are important findings, but the value of production function analysis remains questionable: the coefficients hold only for highly

disaggregated populations; they are prone to shift over time; and the coefficients are still a step or two short of specifying cause-effect relations.

Up to a point, regression analysis can be controlled to incorporate theory of educational processes (ordering the sequence of variables entered into the equation; use of non-linear and dummy variables; separate analysis of different population types; use of so-called "path analysis," which interprets regression coefficients in a more stringent context of theory-based relationships depicted in block-diagram format). Yet major problems remain. First, regression analysis typically uses cross-sectional data to simulate longitudinal process, and this can be seriously misleading (Campbell, 1969; Leucke and McGinn, 1975). Second, the refinements of regression analysis needed to make it conform to reality are beyond the training and patience of most educators and policy makers, and consequently few rely on it with confidence.

Third, and probably most important, policy implications of production functions, to the extent they are clearly significant and broadly applicable, are in most cases saying nothing new. For example, the importance of family background in determining school achievement is part of the age-old conventional wisdom of teachers. The question is, what would it take to overcome that pattern? The answer is not to be found in equations. Rather it must come from the "outlyer" cases — the exceptions to the rule, the innovative programs which need to be studied as "intact" experiences, and not as a set of data points lost in the fringes of the aggregate educational "system."

In sum, production function estimates can confirm general insights regardings the relative effectiveness of different interventions into the school and its social environment; but the numerical coefficients of individual studies are likely to be unreliable as basis for resource allocation decisions,

no matter what refinements are made in the technique.

Some of the problems of regression analysis can be avoided by basing the estimation of input-output relationships upon the analysis of specific policy options, entailing in-depth study of factors that make the options comparable or distinct. In effect, this means we are now talking about cost-effectiveness analysis, the next type of model to be considered.

3. Cost-effectiveness analysis. General issues of cost-effectiveness analysis have already been discussed. The question how to measure "effectiveness" will be taken up later, in Section IV, dealing with performance indicators. Here, the focus is on alternative analytical models for cost-effectiveness.

The first consideration is whether analysis is to focus on education purely as an economic investment. If so, "effectiveness" becomes translated into monetary terms, and the usual term for this kind of approach is cost-benefit analysis. There is no need for much elaboration here. Good expositions are available in the literature (Hardin and Boris, 1971; Blaug, 1967 and 1970; Somers and Woods, 1969; Levin and Shank, 1970; Kiker, 1971; Mincer, 1962; Hansen and Weisbrod, 1970; Arrigazzi, 1972)

"Cost-benefit" and "benefit-cost" are generally interchangeable terms. Either way, this kind of analysis can refer to a variety of formulas. One can calculate either a benefit-cost ratio, or net benefits. A similar but distinct calculation yields an internal rate of return, which can be compared with the going interest rate (or "discount rate") to assess the relative merit of the project vis-a-vis other opportunities for investment. Another variation is to calculate the pay-back period. All these approaches share the same basic premise: that streams of costs and benefits can be compared by using appropriate rates of discount against amounts that accrue in future years; all this assuming that intangible items (those which cannot be monetized) are neglible.

New developments in the field are of two types. On the one hand, refinements are made in the treatment of certain calculations that underlie cost-benefit ratios, for example in the choice of discount rates, the estimate of shadow prices, the application of sensitivity analysis for questionable parameters, the treatment of consumer surplus, determination of project life-time, and so on. These "refinement" ~~issues are briefly covered in~~ issues are briefly reviewed in Appendix E. As pointed out there, a series of deliberate choices has to be made in selecting the parameters of any cost-benefit calculation, and these choices are sometimes best brought to light by an advocacy approach, with opponents and proponents of each project determining the outer boundaries of uncertainty, as explicit input to decision-makers. In some respects, however, the state of the art has achieved definite progress, closing the gaps of disagreement, for example in developing rule-of-thumb conventions about the monetary equivalents of categories like time savings, accident prevention, lives saved, aesthetics preserved, crime deterred, unemployment avoided. (See, for example, the annual publication, Benefit-Cost and Policy Analysis; and Hill, 1973).

The other type of development in the field of cost-benefit analysis is not aimed at refining traditional techniques, but expanding the concept of cost-benefit to cost-effectiveness (which considers non-monetary outputs) and beyond. What lies "beyond" cost-effectiveness? Some see cost-effectiveness as an input-output component of a layer modelling format which sometimes goes by the name of systems analysis. (See especially Ryan, 1964; Abt, 1966; Coulson and Cogswell, 1965.) For others, cost-effectiveness leads to multiple objectives, calling for judgment in weighing different goals against each other, and permitting more attention to the process of re-designing options to capture the best possible trade-offs among objectives. (See Appendix C,

especially in reference to INTUVAL, a computer-aided approach to the design of programs with multiple objectives.) Finally, there is yet another variation of cost-effectiveness analysis which treats both multiple objectives and multiple publics, using a matrix format. This approach can either provide for numerical weights to be attached to the various objectives and publics considered (Morris Hill's Goals Achievement Matrix), or it can leave them unweighted, with more "circumstantial" information provided to the decision-maker for him/her to arrive at an independent judgment (Nathaniel Lichfield's Planning Balance Sheet). These matrix approaches are considered in more detail in Appendix B.

Perhaps the best test of cost-effectiveness analysis must come from cases where it has been carried out and improved (or at least affected) real decisions. Cost-benefit analysis has only rarely had a discernable apparent impact on educational policy. In some ways, this is understandable: the kind of goals that educators strive for are not well expressed in terms of monetary ratios. Economic efficiency is a poor rallying cry for people with the loftier views of educational roles in social progress that were current in the sixties.

Possibly, some of the disillusionment with education as a driving force in social growth and economic development since the sixties (see Illich, 1971) could open the way for a harder look at the relative efficiency of educational policy options. As director of Chile's educational planning operations in the sixties, Ernesto Schiefelbein found wide disparities between the productivity of educational programs directed toward similar goals. Arrigazzi (1972) reviewed earlier benefit-cost studies of educational options in Chile, offering constructive criticism and improvement. These represent rare but instructive cases of systematic and cumulative improvement of methodology. Significantly, they refer to cost-benefit applications in a specific policy context.

Elsewhere, benefit-cost analysis has not fared as well. Its most ambitious application to date has not been in the field of education but in the famous debate over choice of site for London's third airport. (See Flowerdew, 1974.) There, final recommendations were overturned because the benefit-cost method had failed to capture important intangibles (ie, non-quantifiable outcomes) at stake in the investment decision. The same problem is likely to be even more severe for education than for airport location decisions. In its pure form, benefit-cost analysis can help prevent grossly inefficient choices; but it cannot weigh marginally close alternatives with much credibility. Two questions remain unanswered after net benefits have been calculated: benefits for whom? and are economic benefits really what education seeks as beneficial?

In search of better answers to these questions, analysts have turned increasingly to formats and processes which give explicit attention to multiple publics on the one hand and multiple objectives on the other. (See above.) Benefit-cost analysis retains two advantages over these newer approaches, however. One is that it has more codified conventions, a longer history of application, and more rigorously defined procedures, so that its weaknesses and strengths are fairly well known, at least among trained professionals. Secondly, benefit-cost analysis makes some attempt to make present and future values commensurable by use of discount rates, which are ignored in most other approaches. The discount rate is itself a highly problematic variable, and one of the most sensitive parameters affecting benefit-cost calculations. The determination of appropriate discount rates for different educational projects is a vital area of research and debate. Principally it involves the question of opportunity costs for educational resources, and this is why educational finance becomes an inseparable issue from benefit-cost analysis. The University of California at Berkeley has a contract from AID to investigate this issue of

educational cost and finance, and their work has led them unavoidably into the issue of equity. Economists may still have little to say about valuing the mon-monetary outcomes (and costs) of educational policies. But the economist can contribute a great deal by way of analysing the distribution of benefits and costs, however defined. If equity issues continue to grow in importance among planners, the "multiple-objectives, multiple-publics" matrix formats may come to take on a larger role in cost-effectiveness evaluation of educational programs. (See Appendix B.) A major strength of these evaluation formats is their capacity to incorporate more conventional cost-benefit analysis as one "column" of the analytical matrix, showing the distribution of benefits and costs among a variety of producers and users of educational services.

In concluding this discussion, it is worth recalling a point made by Somers and Woods (1969, pp.v-vi) in regard to the implementation and political uses of cost-benefit analysis. The institutional, methodological and conceptual hurdles of applying any analytical device to political issues are formidable. The problems of PPBS are by now well documented (see, for example, Hoose, 1972), but PPBS addresses the same fundamental issues as cost-effectiveness analysis: it directly confronts the "business as usual" mentality of policy making with the hard data necessary to make objective appraisals of everyone's favorite programs. The problem of cost-effectiveness is probably not so much in its preparation, but in the fact that it is such a difficult pill to swallow.

4. Heuristic Modelling. As already mentioned, heuristic models are not algorithms which yield an optimal solutions within a standardized mathematical format: instead, they provide a search format for key elements and relationships in the formulation of complex problems. (An algorithm is a technique, mechanism, or rule structure which prescribes how to reach a fully specified goal. A heuristic, on the other hand, serves to discover, guide, and reveal

goals which cannot be precisely specified because we know what they are but not where they are. See Dunn, 1974, p.37.) Platt (1974, p.5) sees educational planning tending to shift away from target-setting (which implies fixed goals and discontinuity between one plan and the next), toward a "vector" concept of planning (vectors describing a rate and direction of movement, but not stopping places). Banghart and Trull (1973) stress the importance of cybernetic principles in planning, in contrast to the "blueprint" model carried over from physical planning. Cybernetics (the science of communication and control) provides a guidance process, a set of "procedures" and a "direction," and not simply a "plan." Simulation, scenario-building, network scheduling, management information systems, systems analysis, needs assessment — all draw heavily on the cybernetic, as opposed to blueprint approach. (Banghart and Trull, 1973.) Ernesto Schiefelbein (1976), writing from the vantage point of operational planning practices in Chile and other Latin American countries, observes a similar shift in planning emphasis, from pure techniques to behaviorial models and planning heuristics (his own use of the term).

It might be argued that heuristics is just an "easy way out" — a way of dispensing with the rigor of more systematic, algorithmic models, and a way of avoiding political commitments to clearly specified targets. Given these pitfalls, heuristic modelling needs to be justified in the context of well-defined purposes. The approach is useful (a) where basic disagreement exists on the facts, causal relations, or values involved in planning decisions, so that analysis must be opened up to a greater degree of "informed judgment" based on techniques like Delphi, simulation, and dialectical scanning (see Hudson, Davis, et al, pp.71ff; also Appendix C, pp.262-264). (b) Heuristics are useful for relaxing some of the problematic assumptions built into formal algorithms. They do not replace the assumptions, but help reveal what is

"left out" from an understanding of planning problems as a consequence of rigid focus on mathematically defined relationships. (c) Heuristic approaches are especially useful in planning for long-range futures, which can easily be mis-represented by rigid models of projection from past trends: structural relationships change over time as social institutions evolve and adapt; inter-relationships are extremely complex; major events are disjointed, in contrast to the continuity of trends expressed in most mathematical models; and most important, the future is malleable — a function of social commitment, and not just the outcome of forces empirically measured in the present and past.

To be sure, a certain amount of long-range forecasting is carried out in educational planning with major reliance on algorithmic-type models. The U.S. Bureau of Labor Statistics periodically publishes decade-long projections of manpower needs (U.S. BLS, 1974), and demographic analysis is routinely being carred out through the year 2000 (see Morrison, 1976). Heuristic modelling comes in mainly for assessing the broader social, political, economic and technological trends shaped by historical processes beyond the present grasp of mathematical expression. The techniques for long-range scenario building have been evolving quite rapidly in recent years, becoming quite sophisticated and rigorous in terms of procedures. (Educational Policy Research Center, 1970; see also the special issue of Educational Planning 2:3, January 1976.) Two chapters in the OECD book (1973) are representative. In one, Froomkin describes four "heuristics" of long range planning, apart from the more traditional analysis of trend extrapolation: (a) "genius forecasting," (b) "scenario construction," (c) mathematical simulation, and (d) consensus planning (primarily Delphi). Another chapter in the OECD book, is by Willis Harmon et al., titled "The Forecasting of Alternative Future Histories.

Methods, Results, and Educational Policy Implications."* This work focuses on needs, values, and beliefs as the generators of alternative futures, refering to a half-dozen major "sectors"— U.S. economic performance; world population and subsistence; scientific and technological advance; politics and demography; and U.S. foreign relations.

One can argue with the results of such analysis, but typically the heuristic approach does not aim at a single prediction: it describes alternative futures, the forces moving society toward one or the other, and the points of intervention that are available to policy makers. In most of the recent work, education is not seen as a leading sector or point of intervention for controlling the future. Instead, education is seen in the role of responding to conditions generated by "larger" social economic and political forces. This represents a change, or in some sense a disillusionment, with the thinking of the sixties, which often depicted educational investment as a major force in economic growth and social change. (See, for example, Denison, 1962; Bowman et al., 1966; Robinson and Vaizey, eds. (1966), esp. Part II, "Education and Economic Progress," pp.89-348.)

This brings home, once again, a point made earlier, that educational planning is closely tied in with prevailing theories of socio-economic processes in the larger context of development. This does not mean that strong links have been forged between educational planning and national development plans, or between planning and research on educational effectiveness. But it does mean that new models underlying educational planning seem to evolve in a way that is fairly responsive to general shifts in the conventional wisdom about the role

*Harmon is Director of the Educational Policy Research Center at the Stanford Research Institute. SRI and Syracuse University each have funding from the U.S. Office of Education for long range planning methods development. (OECD, 1973, p.193.)

of education in economic growth and social change. (See Cohen and Garet, 1975.) The seventies have learned at least something from the failures of the First Development Decade of the sixties; social goals are not fulfilled by economic processes alone; and economic growth does not follow mechanically from educational investments in the way depicted by writers a decade ago. Newer approaches to modelling, in addressing alternative futures, raise the issue of what it would take, especially on a political level, to bring about the more preferred scenarios. Econometric models and even probablistic models tend to focus on something else — a depiction of relationships measured in the past and projected onto the future. Heuristic modelling on the other hand, moves toward analysis of ways to break from the past. In part this reflects a sense of failure in past planning efforts, a realization that the old models were either invalid (Blaug, 1970; Averch et al, 1972) or politically insensitive to the key problems of social development (Goulet, 1971; Hallak, 1974; Faber and Seers, 1972; Caiden and Wildavsky, 1974) or even counter-productive (Dag Hammarskjold Foundation, 1974; Doeringer and Piore, 1971; Edwards and Todaro, 1972; Luytjes, 1971; Illich, 1971; Schumacher, 1973; Simmons, 1974). On the other hand, the heuristic approach also seems to have gained ground by the emergence of isolated models of success among educational systems addressed to basic problems, such as provisions for basic needs among poor people. In this sense, a major contribution to the heuristic tradition seems to be from the sector of non-formal education, the subject of the next section.

III. NONFORMAL EDUCATION*

A state-of-the-art assessment of nonformal education (NFE) is very elusive: (a) it is a catch-all term for everything that formal education is not; (b) it addresses most of the issues related to planning of formal education (see Section I above); (c) a main virtue of NFE is its adaptability to variations and evolution in local conditions; (d) at its best, NFE is so deeply embedded in social and economic processes at large that a "state-of-the-art" for NFE virtually becomes synonymous with assessing general progress in society at large (see Dunn's "learning methaphore" for social and economic development in Dunn, 1971).

Axinn (1974, p.121) has defined NFE as "Any instance of knowledge, skills, attitudes transmission taking place outside the formal education system." But he also entertains a "radically different point of departure" which views the definition of NFE as specifically bound to particular functions or missions of teachers and learners, usually within a developmental context. (1974, pp.3, 7-13.) Much of the NFE literature, therefore, addresses this instrumental facet of NFE, stressing the "investment" component of education rather than the "consumption" element. Coombs and Ahmed's work for example, is based on "a functional view of education, in contrast to the structural and institutional approach used in most educational planning and administration." (1974, pp. 7-8.)

On the other hand, it is important to recognize that much of the NFE literature addresses a broader range of issues, paralleling those in formal education.

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*Principal sources for this section on NFE include documents from Michigan State University, Institute for International Studies, College of Education, which has received major support from AID to study NFE (esp. Axinn, 1974; Hunter, Borus and Mannan, 1974); and the work of the International Council for Educational Development (ICED) prepared for UNICEF and The World Bank (Coombs, 1973; Coombs and Ahmed, 1974; Ahmed and Coombs, 1975).

(a) Part of the popularity of NFE is its adaptability to the needs of lifelong education. The Faure Report and other influential sources have helped spread the message that most education is not formal, but based in community processes (Harbison, 1967), peer and family influences (Coleman, 1966), and workplace (Mincer, 1962).* The BLS reports that 5 million Americans were enrolled in home-study courses in 1972 (U.S. BLS, 1974, pp.20-21).

(b) Another reason that NFE addresses a broad spectrum of education issues is that it tends to pick up the slack of disenchantment with formal education on a wide front. (Illich, 1971; Simmons, 1974.) Attributed failures of formal education range from its inability to inculcate values (Greeley and Rossi, 1966) to its bias against the poor (Pearl and Reissman, 1965; Dore, 1975; Bowles, Gintis and Simmons, 1976). NFE thus is seen by many as an attractive (albeit still unproven) alternative to these ends.

(c) Finally, the all-embracing quality of NFE is fostered by an appreciation of the complexity of development efforts. Even starting from a narrow, economic, functional focus, changes in NFE-based skills/knowledge/attitudes lead to other changes and needs for adjustment. For example, skill training often yields benefits only when workers, employers, and the community as a whole learn how to use those skills (Harbison, 1967, p.22). Otherwise, the community is simply left with better-educated unemployables, or with out-migration of skilled people (Luytjes, 1971; Edwards and Todaro, 1972). As another example, NFE might start with the introduction of a new educational medium, say radio broadcasts to rural villages; but building on the potential of this medium requires the provision of other media — work-books, processing

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*Mincer has calculated that more than half of the "human capital" component of the U.S. male labor force is formed on the job, and less than half in formal schooling.

of feedback from peasants on the relevance of broadcasts to local problems, newsletters, development of texts to clarify the meaning of individual programs within an overall development strategy, and so on. The history of ACPO (Accion Cultural Popular) in Colombia is a good illustration of this process. (See Ahmed and Coombs, 1975, Chap.1.)

One reason why NFE is so difficult to pin down is that if there were any well-validated and politically acceptable formulas for success, the strategy would tend to become part of formal education, like any other pilot project. Or, if NFE succeeded in solving particular problems, it would go out of business (or into a new one), unlike the tenacity of formal education to persist beyond its usefulness. In either case, NFE "dissolves" in the process of success. The state-of-the-art of NFE planning, therefore, is like a moving weather front, rather than a cumulative edifice of knowledge. One can specify "issues for further research", but the "core" features of NFE, as distinct from formal education, are few. They include the following:

1. Cost-savings. This is a less powerful argument for NFE than it once was. Some NFE supporters feel that the low-cost argument has been detrimental, given the expensiveness of certain NFE projects and the importance of other, more distinctive and compelling selling points. (Personal communications with staff of AID/Washington, Fall, 1974.)

Good sources of NFE cost analysis include Hunter, Borus and Mannan (1974) and Coombs and Ahmed (1974). Coombs and Admed's case studies are presented in some depth but are also grouped according to general categories of NFE such as agricultural extension, cooperative self-help programs, and integrated rural development. Comparisons of costs and performance are then made within each of these group. This helps to avoid the mixing of apples and oranges, and juxtaposes programs which have most to learn from each other. Cost-effectiveness

comparisons are particularly revealing for certain pairs or groups of programs: PACCA in Afghanistan and Puebla in Mexico; ACPO in Colombia, Gezira in the Sudan, and the Comilla project in East Pakistan. In one comparison of six rural training programs, costs per trainee were found to vary between $20 and $3,200 (see page 196). In examing the difference, the more expensive program was found to have superior results on some counts but significantly poorer results on others. (This analysis reveals how misleading cost-effectiveness comparisons can be when limited to single indicators of performance.) The Coombs and Ahmed book is particularly useful (pp.197ff.) in synthesizing case study material to draw out strategies for reducing costs (eg collaboration with formal education institutions to reduce overhead.)

2. Adaptiveness. This is probably the most widely cited virtue of NFE, and it refers to several things: flexibility to change over time, sensitivity to local needs and conditions, and capacity to exploit new media and subject materials. The key lies in working outside of established bureaucracies to avoid vested interests, conservative political pressures, and the pure inertia of large institutions. But the issue is complex. (a) Often, adaptiveness is bought at the price of quality control. (b) Successful NFE, at best, will grow and spread, and create its own institutional rigidities. (c) NFE can be as complex as formal education, and perhaps more so, being a less "self-contained" activity and more woven into other social processes.

3. Equity, or outreach to poor majorities. The argument that NFE better serves the poor is based on several premises. (a) It can focus more directly on the basic needs of poor communities. (b) It puts less emphasis than formal education on formal pre-requisities, screening, certifying, and social selection (Dore, 1975; Pearl and Reissman, 1965). (c) NFE can be part-time and short-term, requiring less sacrifice of income foregone for poor students.

But there is another side of the story, too: (a) NFE can become a "second-class" education for the poor, widening the gap of social opportunities between classes (Pearl and Reismann, 1965). (b) Alternatively, expensive NFE programs tend to be instituted as pilot projects in relatively well-to-do areas, without budgetary means to expand offerings to poorer clients (U.S. GAO, 1974). (c) As long as NFE does not directly confront the class biases and regressiveness of the formal system, its effects may be swamped by the social and economic forces acting to perpetuate inequity. In fact NFE may reinforce the deep structural foundations of social injustice by implying that Something Is Being Done. (Gintis, 1972)

This leads to more far-reaching issues: How explicitly can NFE raise ideological questions of development? Can significant structural change begin with the kind of social mobilization that NFE could promote among peripheral groups? These may be the most significant questions of all concerning NFE. Nevertheless, they lie beyond the scope of conventional definitions of educational planning.

IV. INDICATORS OF EFFECTIVENESS

There exist compendia of educational system performance indicators (for example, Carr-Hill and Magnussen, 1973). The state-of-the-art is best seen, however, from the broader perspective of the "social indicators" movement, which emerged in the policy sciences during the Seventies. It reflects several concerns: first, the need for better specification of objectives required by rational planning techniques such as PPBS, system analysis, cost-effectiveness analysis, logical framework specification, MBO (management by objectives), as well as traditional preparation of Master Plans at regional and municipal levels. Second, social indicators have grown out of the need for better evaluation of social programs, particularly with the proliferation of social legislation under the Kennedy, Johnson, and Nixon administrations. Third, social indicators serve to monitor side effects of major public or private investments. Environmental Impact Reports, now commonplace, provided the lead for Social Impact Reporting now under discussion (Grigsby and Glickfield, 1976). Fourth, they reflect a concern for political accountability in the post-Vietnam/Watergate era. Along these lines, there has been a growth of Advocacy Planning; a greater involvement of the U.S. Congress in reviewing the Executive Branch (through the General Accounting Office); the establishment of national citizen's groups like Common Cause and Public Interest Research Groups; and greater involvement of academic institutions in policy research. A dramatic example of the U.S. strength in this type of work was the divergent fates of the French-British Concorde and the American SST. Europeans attribute the difference largely to the availability of social data on SST impacts. (Key data collected in Europe was held as confidential by those governments.)

The relevance of all this for education is two-fold. First, there is growing concern for educational relevance to social objectives beyond school

efficiency, or traditional economic goals of manpower planning and higher average incomes. Second, there is greater appreciation of the overwhelming impact of social processes on schooling outcomes. (See the Coleman Report, 1966; Averich et al, 1972.)

Indicators of educational effectiveness fall into three general classes, depending on the "production function" one has in mind. (See earlier discussion of production functions, esp. p. 25 above.)

1. School-based indicators are usually measurable within the educational system itself, and reflect its internal efficiency. These may include measurement of unit costs per graduate or per pupil-hour of instruction; classroom hours of instruction; growth of enrollment, retention and promotion rates; drop out and "force-out" rates; ratios of enrollments to relevant population age groups; instructional inputs per pupil (teachers, textbooks, equipment, classrooms); instructional technology utilization; proportion of private and public funds spent on education; vandalism of school property (an index of alienation from educational processes).

2. Economic output indicators generally refer to the effects of education on human capital formation. Measures include: numbers of graduates by level; graduates by occupation; follow-up studies of graduates actually working in their field of training; incomes of graduates; regional location of graduates; unemployment among graduates; unemployment in society at large; on-the-job training accompanied by subsequent employment.

3. Social process indicators. These include economic outputs, but with more specific reference to social objectives, including small business starts; social projects undertaken; cooperative societies established; local participation in educational planning; geographic stability of graduates; voluntary contributions of local community to school activities; equal educational

opportunities among sexes, regions, income classes, castes, races, ethnic groups, religions, and (some would argue) intelligence levels; self-reliance of local communities; "sense of efficacy" among graduates (for example, as measured in the Coleman Report, 1966); fulfillment of "basic needs" like food, shelter, health; development of careers and life-styles blending intellectual and manual labor; reinvestment of economic surpluses within local communities; organization of self-help services for the poor.

There are other ways to categorize indicators. For example one can refer to "input" indicators, depending on which part of the production function one is interested in. One can also distinguish "product" indicators from "process" indicators, where processes (eg team teaching) are more easily observed than final outcomes, and are held to be beneficial based on theory or past experience.

It also is useful to differentiate between "outputs" (Intended, directly controlled results) and "outcomes" (usually unintended, resulting from the interaction between outputs and the social environment). Outputs and outcomes are sometimes refered to as primary and secondary consequences respectively. One can further speak of tertiary consequences as the structural changes in the environment itself, in regard to values, institutions, distribution of power, and other permanent outcomes. (The line between primary, secondary and tertiary is fuzzy but useful: much of the fundamental criticism of schooling in current literature is addressed to "tertiary" issues as seen in the writings of Illich, 1971; Katz, 1971; Faure, 1972; Simmons, 1974; Gintis, 1972; Hallak, 1974.) In contrast, "Mainstream" educational literature usually refers to "primary" consequences. Those who focus on "secondary" effects of education are generally concerned with particular communities, with education seen as only one part of a larger set of social processes (see for example, Luytjes, 1971; Freire, 1970; Pitts, 1975; Raper, 1970; Anderson, 1973; Bugnicourt, 1972; Coombs and Ahmed, 1974).

Most textbooks on cost-effectiveness analysis, PPBS, systems analysis, management information systems (MIS), evaluation research and related fields have at least one chapter devoted to "measurement of objectives," or "performance criteria." A representative survey (see Denison and Rosenstock, 1972, pp.171-180) suggests five bases for evaluation of program objectives:

--appropriateness (is the indicator a valid measure of the ultimate goal being sought?)

--effectiveness (how closely can the program attain a specified target?)

--adequacy (how significant is the target vis-a-vis the total scope of the problem?)

--efficiency (how cost-effective is the program, in terms of attainment per unit of resources spent?)

--side effects (positive or negative, how are these to be weighted alongside "primary" outputs and costs?)

There is considerable discussion on the relationship between equity and efficiency as criteria for program evaluation: are the two goals basically in conflict? Are they compatible under specific conditions? Should they be considered under a single weighting scheme ("distributional efficiency" being subsumed under a larger concept of "grand efficiency"); or do they refer to entirely different forms of logic, involving a concept of economics vs. a concept of social justice? Weisbrod (1970) points out that distributional aspects of social programs are rarely monitored in practice (for an exception, see Hansen and Weisbrod, 1969). Weisbrod's own criteria (1970) for measuring distributional outcomes are quite different from Denison and Rosenstock's list mentioned earlier, suggesting that equity and efficiency indicators might be fundamentally different in nature.

In one repsect, at least, equity issues represent one of the most promising applications of performance indicators. The relationship between educational inputs and outputs, the validity of measures, and the value of benefits are likely to be argued over for a long time to come, but the question of who gets how much can be settled fairly quickly and objectively.

The social indicators movement, for all its faults, raises important questions about the epistemology of policy sciences and the nature of social processes, apart from the effectiveness of particular programs. It should continue to serve education well in all these regards. A few problems concerning performance indicators should also be mentioned briefly, however.

1. Qualitative vs. quantitative objectives. Some quantitative measures serve as proxies for educational quality: retention rates, low rates of vandalism, teacher credentials, income of student's parents (which correlates with the motivation of students and teachers), rate of programmatic innovation, low teacher turnover, expenditures per student, and richness of supporting inputs such as ETV and library facilities. On the other hand, the substantive goals of education are not well described by the educational processes themselves, and promotion of the school system's internal efficiency may be counterproductive to the broader functions of formal learning in society. Certain educational programs, for example, might bring about significant intangible costs—implicit rejection of rural life styles; the fostering of a consumption ethic that outstrips national production capacities; or the diversion of national resources away from appropriate labor-intensive technologies. As Schumacher points out (1972) a plastic chair that we might design eminently well for the function of sitting down may be horribly "inefficient" from the standpoint of Buddhist economics: for Buddhists, the function of a chair cannot exclude the aesthetic of its carving, whereas plastic—far from being "cheap" as its market

implies—draws on non-renewable resources and cannot be recycled back to nature, both violations of a chair's "natural" function.

2. Reporting formats. Data are only as good as the context which transmits their message. More often than not, crucial information is lost among trivialities and lacking in accompanying prose to illuminate its significance, accuracy or source. Baseline data is a frequent omission, especially in regard to baseline trajectories: simple before/after comparisons are often misleading, since "improvements" in this interval may actually represent a decline from an earlier, higher rate of improvement. Third factors (besides program inputs) which may have affected outputs are generally unstated. The "logical framework" reporting format used by the U.S. Agency for International Development for many of its education programs addresses some of these problems.

Another problem of reporting is the tendency to undertake expensive studies or establish elaborate data monitoring procedures without prior understanding of who will use the data, or of which data will best serve actors and decision-makers. All-purpose, data-gathering serves no one in particular and no one well. A better focus on critical problems can often be achieved by a journalistic style of reporting, as a complement to more formal evaluative review and analysis. Journalistic investigation has been used extensively by the Peace Corps for internal evaluation. Other "soft" forms of evaluation are mentioned in Appendix C.

3. Innovation. Programs aimed at creative experiment (or at social evolution in a broad sense, as discussed by Dunn, 1971) may shift their objectives over the life of a program. A major goal of education closely tied to social development might in fact be a clarification and shift of purposes. In contrast, a program rigidly adhering to fixed objectives might prove

reactionary and inadaptive to the kind of turbulence that characterizes significant social change.

4. Embodied knowledge. Some goals of education cannot be disembodied from specific social contexts, but make sense only in concrete settings. Take the five basic goals of education proposed by Stephen Bailey (1969, pp.7-8): one is "contact with a variety of people"; another "exposure to a variety of domains of work and pleasure"; another, "knowledge of consequences of both ecological and human relationships."* These make sense, but they can only be assessed in terms of performance indicators through a process of exploration adapted to local conditions.

5. Politically unacceptable indicators. It has become fashionable to speak of "outreach to poor majorities," and one can devise indicators to measure the degree to which efforts are actually directed to people who have been poorly served in the past. But obviously it takes more than better monitoring to change the behavior of the "haves" toward "have nots"; and without such changes, better monitoring is only an embarrassment. One can measure where new schools are built —in districts that already have them, or in politically disenfranchised areas that haven't. One can record how much time technical assistance advisors spend outside the capital city region of poor countries. One can measure the immediate income gains among (relatively well off) suppliers of educations vs. the future (and heavily discounted) gains among students. One can measure the net benefits of education to small and poor communities vs. the benefits to richer regions which skim off the most productive graduates. Yet indicators are only welcomed by people willing to act on them; and those willing to act usually don't need indicators to tell

*The other two are more traditional and amenable to performance indicators: mastery of basic language tools (words and numbers); and mastery or appreciation of manipulative skills.

them what needs to be done. There are exceptions, of course. John Kennedy was reported to have been deeply affected by the careful documentation of poverty in Michael Harrington's The Other America (1962).* Even here, however, the significance of the documentation was not so much in the raw data as in the way they were presented, and in the political inclinations of an audience powerful enough to act on them.

Given these (and other) problems of indicators, it is well to conclude with a brief summary of their virtues:

--indicators can be turned into graphs which are useful for summarizing large amounts of information, either cross-sectionally or in terms of time trends;

--they help to focus debate on specifics: are these the right objectives? the right way to measure them? the right data? the right comparisons? the right moment to act on findings?

--disagreement about the usefulness of indicators does not necessarily indicate a flaw in the data so much as a "litmus test" of the tacit assumptions, beliefs, and world-view of the commentator. This is useful in itself, because tacit knowledge of this sort probably plays a significant role in planning and policy decisions, but rarely becomes an explicit focus of debate. (The importance of revealing differences among views for explicit confrontation and reconciliation is further discussed in Appendix C.) Debate-free indicators are to be found either where they refer to a fairly meaningless level of generality (larger budget allocations, more advanced staff training, higher "quality" teaching, "better" management), or else where a situation is so well defined that

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*See Arthur M. Schlesinger's A Thousand Days, 1965, Greenwich, Conn.: Fawcett Crest, p.922.

one is operating in a "surprise-free" environment - for example, college entrance examinations in the context of a well-established tradition of higher education.

V. PLANNING PROCESSES AND STRATEGIES: TURNING KNOWLEDGE INTO ACTION

There are various "meta-criteria" one can apply to planning theory, that is, criteria for assessing the scope, character and adequacy of various planning theories. One feature shared by most planning theories is a concern with strategies to link organized knowledge to organized social action (Friedmann and Hudson, 1974). This basic idea of linking knowledge to action underlies the present discussion of planning processes and strategies.*

One way of approaching this review would be to survey present educational planning practices, particularly with reference to institutions that translate planning knowledge into planned action. A Special Issue of the journal Educational Planning (2:4, January 1976) presents an example of this approach. Farrell (1974) has carried out a comparative review of educational planning infrastructure and constructed a Gutman scale of institutional capacity. For example, he finds that most countries have an educational "plan"; fewer have good statistical services to keep the plan current or integrated with other sectors; fewer still link planning with budget-process implementation á la PPBS. Farrell's work is useful because it suggests a logical sequence for building up planning capacity, that is sensitive to a countrys' own history and resources to mount such an effort.

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*Other meta-criteria for judging the adequacy of a planning theory might include: explicitness about theories of social change; concern for problems of social learning as well as social action; inclusion of normative issues, such as social justice; tendency to promote self-control by individuals of their own lives; explicit identification of issues neglected by the theory; provision for participation in planning; adaptiveness to a range of social conditions; self-reflexive (or self-critical) nature of the epistemology underlying the theory.

Extending Farrell's idea, there may be a sequence in the kind of social processes that planners come to acknowledge as part of the "educational planning problem." (1) Initially, the problem can be defined as a problem of economic growth: how to train the right categories and numbers of people to sustain industrial development (viz manpower planning, as developed in the sixties). (2) Subsequently, however, this raises new issues of developing an administrative infrastructure suitable to "modernization" of the educational system. It is not just a matter of linear expansion of existing programs, but educational reforms, establishment of new institutions for curriculum renovation, media development, and above all, enrichment of managerial capacity. (3) Given all this new capacity to implement new ideas, planners begin to ask themselves - why don't plans usually work? Or when they work, why do they produce the wrong outcomes? (See previous references to criticism of planning models in Section II.) Planners find themselves forced to deal with the social context that affects educational policies: the way it affects policy implementation; the way it affects policy formulation and decisions; the way it sets priorities (eg. equity vs. efficiency, modern sector development vs. saving traditional productive capacities; rural vs. urban investments). As Watson suggests (1974), real decisions and actions are rarely based on the kind of models educational planners use. The reason is, the models refer to a simple objective function, which makes sense only if one considers education a simple and closed system. In reality, education is neither simple (it is a complex social system in itself) nor closed.

(4) There follows renewed attention to planning models that can handle complexity. Decision free techniques, network scheduling, and management information systems allow the analyst to work closer with people

"on the line." More data can be handled; probabilities and contingencies can be planned for; new factors plugged into the information-handling process. (Davis, 1971, pp. 42-54.) Heuristic modelling takes its place alongside the more rigid algorithms of traditional planning practice (see Section II above).

(5) But even with all this, educational planning processes cannot embrace significant factors bearing on the educational processes themselves. One significant factor is politics. Hallak (1974) argues that most educational planning models tend to treat educational problems purely in terms of technological relationships. But the problems are mainly political ones: especially in regard to the question of value trade-offs within education, and the question of whom the school system serves in society at large. His point is — there are no technical answers to political questions. (See also Dickson, 1975; Allison, 1971.)

Benveniste (1972) treats the same issue on a somewhat different level, refering less to politics at large and more to the "politics of expertise" and the particular distortions introduced by technocratic attitudes toward social problems and educational processes. (See also Goulet, 1971.)

On a more descriptive level, there has been a growing literature on the politics of educational planning reflecting particular country experiences (see the special issue of Educational Planning, January 1975). Davis and Lewis (1975) devote the final chapter of their book to a useful review of recent U. S. legislation bearing on employment, jobs, and training. Legislative intent is evidently another important facet of the politics of educational planning.

(6) Politics are not the only factor mediating educational planning outcomes in the larger social context. There are a host of social institutions which serve to create balances or imbalances in the supply and demand of school-provided skills: economic cycles, labor market segmentation, rates of entry and exit from the labor force, flexibility in hiring practices, technology developments affecting skill requirements, on-the-job training, military supply and demand for skills, and so on. These might be called quasi-market factors, in the sense that they refer to all the supply and demand adjustments which operate outside of (a) the normal flows of graduates from rural schooling and (b) adjustments in those flows designed by traditional manpower planning. (A more detailed review of quasi-market factors i found in Section I of this paper, pp.8-9.)

(7) Social mobilization is yet another factor which lies outside the traditional scope of planning for educational systems, yet it addresses the same issue of harnessing "underutilized" human resources to social and economic objectives. Kulp (1975) has written about the "campaign" approach to development (health programs, literacy campaigns, public works projects) and about the advantages of mobilizing people simultaneously for the purposes of education and social action. (See also Breeden, 1970; Barbadette et al, n.d.) Paolo Freire's approach is similar in stressing the need to build education around consciousness-raising and "cultural action." (Freire, 1970.) Good examples of building an educational system around problem-solving include the Colombian organization, Accion Cultural Popular (ACPO), and Ahmednagar College in India. (See Hudson, Davis et al, pp. 61-70; also pp. 53ff for other cases.)

In a sense the campaign approach runs parallel to the American pragmatist philosophy of education: people learn best when they know first-hand the significance of applying that knowledge. The "social mobilization" context for education planning is also consistent with theories of development going back to Joseph Schumpeter: in this view, the key is not resource availability (whether natural resources, capital, human resources or knowledge), but rather entrepreneurship. The French observer, Servan-Schreiber strikes a similar chord in his assessment of the United States' comparative advantage vis-a-vis other nations. The American secret, he concludes, consists of breaking out of institutional rigidities in order to make things happen. It calls for a "revolution in our methods of organizing...the key to everything else...what counts is the determination to liberate initiative and show confidence in man at every level" (The American Challenge, 1968, pp. 262, 266, emphasis in the original).

There is a potential contradiction here: how can one plan to liberate other's initiative? Can one help others be self-reliant? Can one tell others "how to do it" without undermining their capacity to understand for themselves? It is not clear that these contradictions are actually capable of resolution at all; but it is clear that educational planners are beginning to grapple with the issue (see Hudson, Davis, et al, 1976, Appendix C, "Technical Assistance for Self-Reliance: Paradox or Promise.")*

*The Chinese have given explicit recognition to this dilemma in formulating "the mass line" in policy directives. The mass line is supposed to build on the wisdom, incentive, and practical experience of peasants and workers based in autonomous organizations, yet it also seeks to diffuse experience from one locale to another, to set political guidelines, and use resources efficiently. It aims at mobilizing people for change, but without disregarding differences in peoples' readiness for change. The balance between talking and listening, pushing and bending, mobilizing and sustaining local initiative is recognized to

(8) Structural reform. It is hard to argue against the proposition that education should be linked more closely with organized social action, particularly in a development context where there are obvious unmet basic needs. But once educational planners begin to consider the social context embracing school processes, many take the next logical step and ask, Is it enough to mobilize people for sporadic campaigns and then leave them — better educated and rid of a particular problem, but with nothing else gained? Or will social processes and institutions continue to re-create those problems, unless the structures themselves are changed?

Structural theories of social processes affecting education have already been mentioned. The bottom line of this approach is the need for basic change in the structure of employment opportunities, both in terms of re-organizing the work place and in the overall guidance of economic policy at local, national, and international levels. The major theoretical work on social structural reform as a context for significant educational planning has been couched in radical criticism of capitalist structures (see especially bibliographical material compiled by the Union of Radical Political Economists). In some cases, the relationships between educational planning and social structural reform are revealed by national major commitments toward structural change and subsequent attempts to work out educational implications. The context is often a decisive turning toward realization of socialist or cooperativist principles (Tanzania's Declaration of Aruska; post-revolutionary Cuba; China during the cultural Revolution; Guyana's turn to cooperativist principles). Educational change in these cases often has characteristic

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be a matter of constant struggle and debate. There are no "formulas" of the kind educational planners in the west like to rely upon.

features: (a) it carries politics into the classroom, making ideology an explicit aspect of the socialization which all schools provide; (b) in the cases mentioned (among others) there is considerable stress on community self-reliance as a substantive focus of educational training; and (c) educational change is treated as experimentation on a mass scale, neither limited to the cautious innovation of pilot projects, nor imposed with finality. Typically, there is extensive evaluation and political debate, sometimes with encouragement for local variations and initiative-taking in new directions.

(9) This brings up a final series of "knowledge to action" strategies bearing on educational planning: How does a system "learn," whether a school system, or social system or society of professional planners? What constitutes memory of past mistakes and successes to build on elsewhere? How to evaluate experience derived from widely varying circumstances and adapt this to new settings?

Briefly, three kinds of "learning" models can be found in the literature, that bear on educational planning. First there is the cybernetic (control and communications) approach, the familiar "feedback loop" in systems analysis block diagrams. ("Compare actual outcomes against targeted objectives, and make necessary adjustments of inputs.") On a more general level, the approach calls attention to the iterative nature of rational planning, and the need to re-consider goals, identify new alternatives for action, new means for implementation, new data on problem formulation.

The limits of this approach to "learning" reflect the limits of the "rationalist" planning tradition discussed in a variety of literature. (Friedmann, 1973; Friedmann and Hudson, 1974; Allison, 1971; Caiden and

Wildavsky, 1974; Faber and Seers, 1972; Goulet, 1971; Hampden-Turner, 1975; Hoos, 1972; Illich, 1971; Schumacher, 1973; Simmons, 1974; Watson, 1974). Criticisms include ideological ones (rationalist planning preserves the status quo); pragmatic considerations (not enough attention is paid to the realities of organizational and human behavior to specify appropriate action); epistemological criticisms (rationalist models ask the wrong questions about the quality of human experience and program outcomes that can't be quantified specified apriori); and operational issues (significant social action requires a commitment to stronger ideals than insipid abstractions like GNP and other numerical targets). In short, "learning" that will serve "doing" requires more than "feedback," just as "education" must be more than a well designed program of stimulus-response.

(10) A second approach to "systems learning" draws on a quite different literature of educational planning. One term for it is knowledge networks (Hudson, Davis et al, 1976; PADCO, 1975; Leavitt, 1975), and it emphasizes a case study approach toward building up a repertoire of successful strategies for significant educational change. Networks can be formal or informal. Formal networks tend to emphasize storage and retrieval of information, either in the form of documents or raw data. Examples are ERIC (Educational Resources Information Center), Systems Development Service, The Inter-University Consortium for Political Research, The Bureau of Labor Statistics, and the International Demography Data Directory. Informal networks, on the other hand, are built on personal relationships, derived from old school ties, joint work on international technical assistance teams, professional associations, and other shared experience. Unlike

formal information storage/retrieval systems, personal networks bring people together who tend to share similar values, outlooks, and professional styles, and not just to examine "objective" data on a particular problem area.

(11) Finally, there is "creative learning," although what is meant here defies precise definition. It has three aspects which go beyond both cybernetic adjustment and the accumulation of wisdom through knowledge networks. (a) Creative learning requires a specific type of consciousness about the nature of social change and development. To operate at this level of consciousness, the planner must be willing and able to analyze the growth and development assumptions which underlie the system of intervention. There are a range of possibilities, from scale growth and allometric growth through to programmed learning and creative learning (see Dunn, 1971, pp. 8-30). Creative learning systems are non-deterministic and adaptive, and require "higher" levels of information processing. (Dunn, 1974, pp. 36-38).* A similar point is elaborated in Vicker's work (1970) on appreciative" systems. (For further elaboration of Dunn's concept see Schroeder, Driver, and Streufert, 1967, and Anderson 1975).. Anderson, defines intelligence as the capacity of a system for modifying its own knowledge; learning as the capacity to fix a temporary pattern of internal states; and thinking as the generation of a temporary pattern of internal states. He then specifies three levels of adaptive systems: the first is knowledge but no intelligence, with changes in knowledge coming externally, as in a library system. This is adequate in a

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*Levels of information processing are determined by the rule structures of the central processor, consistent with its perception of the environment. For example, a binary rule structure reads binary signals from the environment.

world with little change. Second are systems that know and learn: for this memory is necessary. This applies to lower animals such as jellyfish and sea anemones. Third are systems which know, learn and think. By organizing experience it is possible for a system to see beyond experience and anticipate a future unlike the past.

The key to a creative learning system, then, is the capacity to take departures from the past. The issue is not innovation for the sake of innovation, but the diffusion of capacity for thinking that leads to appropriate action on problems of significant concern.

(b) The second facet of creative learning, that again distinguishes it from cybernetic adjustment and accumulation of memory, is capacity to act and to use social practice as a means for social learning. This is a complex issue. (See Appendix F, on "Praxis as a Medium of Evaluation.") On one level it connotes "action research" of the type Campbell discusses in his widely read paper, "Reforms as Experiments" (1969). On another level it calls for a particular quality in the personality of educational planners — a capacity and willingness to work directly in social action programs, getting their hands dirty in the field and becoming knowledgable about social realities through the process of trying to change them.

(c) Finally, creative learning through social action calls for epistemological foundations different from those of orthodox social science (see Appendix F; also, Goulet, 1974, pp. 161ff; Freire, 1970; Gordon, 1972; Hampden-Turner, 1975; Pitts, 1975; Lawrence and Lorsch, 1967, pp. 11, 160ff; Raper, 1970, forward; Schumacher, 1973).

This is not the place to discuss the "creative learning" approach, or weigh its merits and validity. It clearly occupies a niche among other theories

of the "knowledge to action" processes in educational planning. The overall relation between these knowledge/action strategies, the planning issues discussed in Section I of this paper, and the planning models reviewed in Section III, will be considered in the concluding section of the paper which follows.

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* The previous discussion of the "learning systems" approach to planning draws in part on current work of Walter Siembab, a doctoral student in Urban Planning at UCLA, studying communications theory relating to planning processes. His help on this section is gratefully acknowledged.

VI. SUMMARY AND CONCLUSIONS

The table below summarizes the major issues, planning models, and strategies considered in earlier sections of this paper.

ISSUES	MODELS	STRATEGIES
1. Social demand	1. Manpower	1. Growth
2. Manpower Planning	2. Production Function	2. Infrastructure
3. Cost-effectiveness	3. Cost-effectiveness	3. Implementation
4. Integrated Planning	4. Heuristic Modelling	4. Data management
5. Localization		5. Politics
6. Lifelong education		6. Quasi-market
7. Equity		7. Soc. mobilization
8. Work-relatedness		8. Structural reform
9. Development context		9. Evaluation Feedback
		10. Learning networks
		11. Creative learning

An obvious question arises: is there any meaningful relationship between these three lists? There are several possibilities: (a) Each list shows a progression from traditional approaches to newer ones, and there is a rough correspondence among the three lists. Educational planning is seen to be evolving from its earlier concerns with manpower planning issues, models, and strategies, and moving toward finer-grained cost-effectiveness analysis. Further down each list, there is a departure from an exclusively economic perspective, and greater concern with the

political dimensions of planning. The subsequent stages are less clearly defined, but seem to involve greater consideration for educational processes outside formal school systems, and greater concern for experimentation, evaluation and learning about the conditions of educational success and failure. The exuberance of the sixties has retreated before the sobering failures of the First Development Decade. Mistakes were made, and structures and attitudes have been established that may stand in the way of future steps toward preservation of viable rural communities, a closing of gaps between rich and poor, respect for the environment, and preservations of traditional ways of meeting basic needs through self-reliance and local initiative. In short, educational planning has shifted from a "growth paradigm" to a "learning paradigm."

(b) An alternative interpretation of the table might posit a stronger and more permanent role for the earlier entries in the list. In this view, each issue and each model would have fruitful application to a range of planning strategies. For example, the issue of manpower planning could be examined by an array of models (including cost-effectiveness analysis and heuristics), and treated through a variety of strategies. Thus, manpower issues handled by a strategy of "creative learning" might result in widespread use of para-professionals; a strategy of "structural reform" could handle manpower shortages by a major shift in production technology, altering jobs to fit skills rather than vice-versa.

(c) Still another view might interpret the issues, models, and strategies of educational planning to be in continual flux, analogous to the "random walk" theory of the stock market. Stocks in one or another planning approach rise and fall, for reasons of current fashion, peer pressures, and the whims of funding agencies. Over the long run,

it becomes clear that each approach is insufficient by itself. Work in one area produces diminishing returns, resulting in the discovery (or more usually the rediscovery) of other approaches needed to fill the neglected gaps. For example, the history of international assistance manifests a long cycle starting with 19th century missionaries, followed by post-World War II technical transfer, then "institution-building," and more recently "networking." Presently, planners are beginning to come full circle, rediscovering the missionaries' virtues of dedication to the needs of the poor majority, and close-up insight to the problems and opportunities for tangible achievement. (Hudson, Davis, et al., 1976, pp. 11-15).

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There is probably a certain basis of truth in each of these ways of interpreting the relationships and trends among the issues, models, and strategies outlined in the table. If some master planner could knit these elements together into an overall model or strategy or plan, the items listed in the table might fall nicely into place. Educational planning as currently practiced, however, is based on social sciences procedures which are inherently reductionist and formalistic about the nature of the learning processes they attempt to deal with. It is therefore rare that planners achieve a total picture of the problems of shaping education to a country's needs. Cases of "successful" educational strategies serving major development objectives, or even meeting the minimal needs of the poor, are unusual. Where it "comes together" in this way is rarely on the drawing board of the planner. To be sure, there are exceptions like

the Land-Grant College movement, but even this took fifty years of setbacks, maturation, and learning from farmers before emerging in its now-familiar form (see Hudson, 1976). Given the complexity, the long gestation, and the multiple theories of education and development, it is almost a wonder that success can be rationally "planned" at all.

Yet even this pessimistic appraisal leaves a vital role for the planner, and that is the identification and diffusion of those rare cases of success, often the product of indigenous efforts, where educational programs have been nurtured under particularly favorable conditions of political or ideological commitment, and where education addresses the problems people deal with in their everyday lives.

Not that this would yield formulas of success directly transferable to other peoples and regions. It would simply pose more clearly the question of what would it take for educational planning to achieve significant results. The answer should be clear: it takes more than education alone. It takes ideological commitment, social mobilization, an economic system driven by the interests of specific communities rather than the transcending goal of a higher GNP, and a richness of two-way communication between planners and the people they serve.

APPENDIX A BIBLIOGRAPHY AND BIBLIOGRAPHICAL SUPPLEMENT

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Transportation 4 (1975) 187–206
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BOOK REVIEWS

Morris Hill, *Planning for Multiple Objectives: An Approach to the Evaluation of Transportation Plans*. Philadelphia: Regional Science Research Institute. (1973). 273 pp. Paperbound $6.00.

Morris Hill's concept of a "goals-achievement matrix" offers two principle improvements on traditional evaluation techniques. First, it gives explicit recognition to the incidence of planned outcomes as they affect different groups of "consumers." Secondly, it considers multiple objectives – not just those expressed in the monetized gains and losses covered by benefit-cost analysis, but tangible measures of pollution, noise, landscape aesthetics, and other transportation impacts.

The substance of this book has already appeared elsewhere in the literature. Hill has explained the goals-achievement matrix concept more concisely in an earlier article,[1] which has deservedly received considerable attention. The present book applies this approach more specifically to the transportation sector. For readers of *Transportation*, however, much of the material will seem out-of-date. Hill's bibliography includes more than two hundred entries, but only a half dozen are dated since 1967. This suggests that Hill has not significantly updated the manuscript since that year, when it first appeared as his dissertation. The chief virtue of the book is that its review of earlier literature shows how far planners have come in developing imaginative and sensitive instruments to measure the multitude of consequences associated with transportation projects. It is partly thanks to this growing arsenal of metrics that highways are no longer being smugly justified by their effects on traffic alone, their impacts on a larger set of social domains are coming more sharply into focus.

The first section of the book is devoted to a general discussion of social welfare measurement, as it bears on evaluation technique. Part II offers a more specific review of transportation plan objectives, providing measures of their attainment and references to background literature. Part III is an application of Hill's method to a case study of transportation plan evaluation in Cambridge, England.

Some years prior to Hill's work, Nathaniel Lichfield had undertaken a similar study of Cambridge, using his own technique, the "Planning Balance Sheet." But whereas Lichfield came out in favor of one of the two plans being proposed for Cambridge, Hill's results with the goals-achievement matrix ended up favoring the other. Consequently, a major theme in Hill's book concerns the relative advantages of the goals-achievement matrix *vis-à-vis* Lichfield's Planning Balance Sheet. The comparison is instructive, because it helps point up the strengths of the multiple-objective, multiple-client approach which they have in common. At the same time, it becomes clear that where Hill has chosen to depart from Lichfield's pioneering work in this

[1] Morris Hill (1968) "A Goals-Achievement Matrix for Evaluating Alternative Plans," *Journal of the American Institute of Planners* 34, 2 (January), 19–29.

area, the gains have been achieved only at a price. Hill emphasizes in particular the need for explicit weights to establish the relative strength of claims among objectives and clients, with an eye to optimization techniques and greater use of computers. Lichfield has considered but largely discarded this more mathematical treatment. This raises some useful questions about its practicability, the validity of its underlying assumptions, and its "transparency" or openness to scrutiny by a general public increasingly active in the making of transportation decisions.

The basic differences between Hill and Lichfield are not brought out clearly in the book, but they might be summarized as follows.

(1) Hill emphasizes the importance of an external framework of goals for evaluation of alternative plans, whereas Lichfield is more concerned with letting some of the intangible impacts – for example the unique and intrinsic value of historical landmarks – speak for themselves. For Lichfield, one might say, "a rose is a rose." For Hill, on the other hand, "costs and benefits have no intrinsic value" (p. 218). All things must be rationalized in terms of a priori objectives.

(2) Hill puts more faith in the use of numerical weights to unequivocally establish the relative importance of various objectives and clients. Lichfield himself has applied this approach in his work on Britain's *Traffic In Towns* report, where he developed a single composite index of environmental and accessibility effects attributed to plan alternatives.[2] More recently, however, he has turned away from the use of weighting schemes, and does not include mathematical optimization as part of the Balance Sheet approach.[3] Hill acknowledges that a priori weighting schemes have limited validity when comparing objectives among a variety of sectoral activities, and for this reason he considers the goals-achievement approach useful only "for the evaluation of plans for development in a single functioning sector" (p. 44). Lichfield's Planning Balance Sheet, however, applies to multiple-sectors plans as well.

(3) In foregoing weighting schemes, Lichfield achieves two other purposes of planning that are not as evident in the goals-achievement scheme: one is the transparency of analysis that makes it open to discussion by the general public; the other is the possibility of keeping the design of options flexible, so that the alternatives might be improved or amalgamated in the course of evaluation. In both respects, the Planning Balance Sheet represents an example of "formative" evaluation (concerned with improvement of programs while they are still fluid, and the creation of new options), while the goals-achievement matrix is more concerned with "summative" evaluation (used to appraise programs whose design and outcomes are fairly well stabilized).

(4) Hill is a dedicated believer in the "rationalist" school of planning (see pp. xiii, 5 to 23ff). Thus, he tends to see the world in terms of a neat hierarchy of means and ends, well-bounded problems, and well-behaved solutions, broadly accepted rules for achieving consensus, institutions that respond honorably with regard to their

[2] Great Britain, Ministry of Transport (1963) *Traffic In Towns*. London: Her Majesty's Stationary Office. See especially Appendix 2 of this report.

[3] Nathaniel Lichfield (1970) "Evaluation Methodology of Urban and Regional Plans: A Review," *Regional Studies* 4: 151–65.

public trust, and social sciences capable of achieving a degree of objectivity approaching that of the exact sciences. Lichfield, on the other hand, is less willing to reduce things to an objective function; he is more concerned with rendering consequences in their own intrinsic dimensionality, and keeping the door open to reformulations of constraints and the redesign of options. The Planning Balance Sheet, more than the goals-achievement matrix, seeks an injection of ugly realities, common sense, and public scrutiny at every step of the analysis. In line with this concern, the Balance Sheet gives attention not only to the consumers of a plan but to the producers and operators, whose interests often weigh heavily in the political reality of decision making.[4]

(5) Perhaps most important, Lichfield's work has stood the test of practice, whereas Hill's goals-achievement matrix remains a theoretical concept. As Hill says in the preface to his book, "the method must be further developed along lines suggested here in order to be generally useful." It might be argued however, that Hill's proposals for greater sophistication in the use of weighting schemes and optimization routines will only tend to increase the gap between the state of the art and the state of feasible current practice. Morris Hill himself mainly uses only a very crude version of the goals-achievement matrix whereby he arbitrarily assigns equal weight to all objectives under consideration. Thus, in comparing his own and Lichfield's evaluation of the Cambridge traffic plan alternatives, he generally considers the results of each method according to *how many* outcomes favor Plan A or Plan B, without regard to the relative importance of the outcomes included in the list, or how the ranking of A and B might shift if the various objectives were weighted in a different profile. Sensitivity analysis can help reveal just what effect the choice of weights will have on the overall valuation of alternative plans. A recent article in this journal illustrates precisely how this applies in connection with the use of a goals-achievement matrix.[5] Contingency analysis and *a fortiori* analysis are also useful for testing whether alternative assumptions have a critical bearing or not upon the final ranking among alternative plans.[6] Despite these devices for policing the assumptions of a goals-achievement matrix, however, some analysts would argue that a priori weighting schemes are never desirable

[4] Planning literature which has criticized the basic tenets of the "rationalist" approach includes Charles E. Lindblom (1965) *The Intelligence of Democracy* (New York: The Free Press); Donald A. Schon (1971) *Beyond the Stable State* (New York: Random House); Horst Rittel and Melvin Webber (1972) "Dilemmas in a General Theory of Planning," (Berkeley: University of California, Institute of Urban and Regional Planning, Working Paper #194); John Friedmann and Barclay Hudson (1974) "Knowledge and Action: A Guide to Planning Theory," *Journal of the American Institute of Planners* 40:1 (January), 3–16.

[5] Darwin G. Stuart (1974) "Interactive Sensitivity Analysis in Transportation Plan Evaluation," *Transportation* 3:3 (October), 289–309.

[6] See Gene H. Fisher, *Cost Consideration in Systems Analysis* (New York: American Elsevier Publishing Company, Inc., 1971), esp. pp. 11–13.

in cases where subjective trade-offs are at stake, especially where there are opportunities to redesign plans on the basis of iterative evaluation.[7]

An unsympathetic reader of Hill's book might summarize it with the observation that its most practical and transportation-oriented chapters are out of date, while its attempts to improve on Lichfield are unmanageable and obscurant. But this would overlook some of the book's real merits — most importantly, its lucid summary of progress in measuring the more important externalities of transportation systems, and its central message regarding the need to keep multiple objectives and multiple clients in view. It is a good statement about the shortcomings of benefit-cost analysis, and of the major improvements upon it that are already without our grasp.

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[7] See Peter Kamnitzer (1969) "Computer Aid to Design," *Architectural Design* 39:9 (September), 507–508. Also, Barclay M. Hudson, Martin Wachs and Joseph L. Schofer (1974) "Local Impact Evaluation in the Design of Large-Scale Urban Systems," *Journal of the American Institute of Planners* 40:4 (July), 255–65.

APPENDIX E

BENEFIT-COST TECHNIQUES: TEN VARIATIONS ON A THEME

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Benefit-cost analysis (BCA) is a science only to the extent that it makes explicit the subjective judgments that must go into its calculation, and avoids the pretense of a neutral and objective formula.

In a strict sense, "scientific" investigation consists of exposing ideas to rival data and rival models of explanation. In the context of BCA this means that application of any BCA method should be made in comparison with other variants of BCA so as to reveal how much the choice of method will bias results toward one program alternative or another. As Don McAllister puts it, "the choice of evaluation method is itself an evaluation problem" (1976). The choice of technique is thus always a political choice: each added sophistication in BCA tends to bring out the advantages of some program options relative to others. Without comparisons among methods, one can select variants of BCA in such a way as to justify almost any program alternative one wishes. This is not science, nor is it good use of BCA, yet it is common practice.

The biases of BCA are unavoidable, but they are appropriate and scientifically acceptable to the degree that they are deliberate, explicit, and shared by advocates for each of the alternative plans. Thus does advocacy enter into BCA, as it does into other forms of scientific inquiry.

For heuristic purposes, one can list ten important variations on the theme of BCA. Each of them lends greater sophistication to evaluation, but by the same token each introduces a way of biasing the evaluation

toward (or away from) one's favorite plan. The variants fall into two groups:

Formulas and Procedures

1. Choice of alternatives to be compared.
2. Treatment of time (discounting, and, present value).
3. Computation method: BCA ratio or net benefits.
4. Sensitivity analysis.
5. The decision context (explicit assumptions; what's left out.)

Valuation of Benefits and Costs

6. Shadow prices.
7. Weighting schemes (multiple objectives; multiple publics).
8. Externalities.
9. Secondary impacts and employment effects.
10. Intangibles.

More specifically:

1. Choice of alternatives. Unless special attention is given to the nature of options considered, a "favorite" plan can be offered with only "throw-away" options, without revealing the weaknesses of the original choice, or providing imaginative elements of alternative plans that might be adapted toward an improved design. Typically, one alternative to be considered should be deliberately conservative in its scope, another more "utopian," probing in each direction for otherwise neglected program elements, and giving a balanced context for the final choice.

2. Treatment of time. This concerns the use of discount rates in estimating the "present value" (PV) of future benefits and costs. The higher the discount rate, the more BCA will tend to favor projects that yield early benefits or that can pass on their costs to future taxpayers

or future generations. Discount rates should reflect opportunity costs regarding (a) consumption preferences (b) productivity of social resources. Other issues affecting PV: risk; uncertainty; inflation; project life.

3. Computation method. The main choice is between using a benefit-cost ratio or a net benefit (B minus C) calculation: the latter tends to favor larger projects; the former is subject to arbitary variation, for example depending on whether "cost savings" are included in the "benefit" or the "cost" side of the ratio.

4. Use of sensitivity analysis and afortiori analysis. These allow advocates for each plan to calculate the effect of different data or different assumptions upon the relative ranking of their own plan vis-a-vis the other options. Afortiori analysis shows the effect of giving the benefit of the doubt regarding key assumptions, first to one plan, then another, to see whether any clear "winner" emerges. If none does, the choice between options at least becomes more focused on those elements of subjective judgment which make most difference in supporting one plan or another.

5. The decision context. Decision-makers often draw on particular BCA assumptions to justify an a priori favorite plan. Benefit-cost is at its best, however, in raising questions rather than answering them. Questions of values and cause-and-effect require different models of investigation from "objective" analysis of facts, but they are equally important for BCA. (See the "trans-scientific domains of evaluation").

Computerization of BCA is one way to be inclusive about data incorporated into the analysis, but also a good way to obscure what has been left out, what BCA variants were used or ignored, and other assumptions of the analysis. The computer's aura of exactness and its programmers' aura

of expertise will prevent most people from asking about the inevitable subjective judgments that go into benefit-cost calculations. The same applies to any other attempt to "maximize" information inputs or "objectify" the analysis.

Ways to put BCA in context include: explicit listing of assumptions and alternatives; dialectical scanning; sensitivity analysis; balance sheet methods; advocacy planning and adversary procedures.

6. Estimation of shadow prices. Costs and benefits of many items which are not given by market prices can be estimated by observation of behavioral trade-offs. E.g., the value of a free recreation facility might be estimated from the effort people make to get there. The problem is in determining how valid is the equating of auto travel costs with recreational benefits, and in accurately determining the full costs (or side benefits) of driving.

7. Weighting of benefits and costs. Typically, different segments of the population gain unequally from projects. Weights can be used either to show how different groups have benefited in the past, or to make desired corrections. To abstain from using explicit weights is an endorsement of the current distribution of programs. Weights can also be applied to the relative merit of a range of program objectives.

8. Externalities. These refer to program impacts extending to persons not directly involved. But what to include, and whom, are problematic. Externalities might even include structural shifts in social and economic institutions, and redistribution of power.

9. Secondary impacts. Strictly defined as "pecuniary externalities," mainly involving jobs and income gained by program suppliers. Because suppliers are often better organized than consumers or taxpayers, they can

apply strong political pressure on program decisions. This category of externalities is often ignored by BCA evaluators, but are recognized as important (a) from the standpoint of redistribution (equity), and (b) when unemployed resources are potentially mobilized, creating net gains in real productivity.

10. Intangibles. This refers to non-monetary or non-quantifiable program implications. There are no hard and fast guidelines for what to include, and there is an additional problem of how to include non-dollar items in BCA. The Buchanan formula -- expressed as a ratio of net dollar gains (or outlays) to unaggregated intangibles -- helps focus on what is in the "market basket" rather than the loss or profit that has been made on the side. A useful extension of this formula is the [illegible] Planning Balance Sheet (or its cousin, the Goals Achievement Matrix) which shows various categories of tangible and intangible outcomes broken down according to different groups of beneficiaries.

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